

## TAPE CALENDERING MANUFACTURING PROCESS FOR MULTI-LAYER THIN-FILM SOLID OXIDE FUEL CELLS

### PRIMARY PROJECT PARTNER

**Honeywell Engines & Systems**  
Torrance, California

### TOTAL ESTIMATED COST

\$2,274,188

### COST SHARING

DOE	\$1,770,134
Non-DOE	\$504,054

### CUSTOMER SERVICE

(800) 553-7681

### STRATEGIC CENTER FOR NATURAL GAS WEBSITE

[www.netl.doe.gov/scng](http://www.netl.doe.gov/scng)

### Description

Honeywell will develop a low-cost tape-calendering process for manufacturing high-performance, reduced-temperature (<800°C) solid oxide fuel cells (SOFCs) using the Honeywell unitized cell design. The proposed process has many desirable characteristics for low-cost and high-volume production: robustness, simplicity, scalability, automation, and simple quality control. The unitized cell design simplifies stacking procedures and increases cell handling. The tape-calendering manufacturing process, along with the unitized cell configuration, will contribute to significantly lowering fuel cell first costs while improving cell robustness, life, reliability, availability, and maintainability.

The work consists of three phases and will concentrate on the following major activities:

- Phase I work will focus on justifying the cell configuration to be manufactured. This phase will include a manufacturing cost study and an evaluation of the unitized cell design and manufacturing feasibility.
- Phase II work will involve the development and optimization of the manufacturing process and testing of fabricated cells to verify cell performance characteristics.
- Phase III work will involve demonstration testing of unitized cells and development of a business plan.

The overall result of this project is the development of the tape calendering process suitable for manufacturing of SOFC unitized cells capable of meeting the performance, life, and cost goals required for commercialization.

### Goals

The overall objective of the project is to advance the state of the art of SOFC design and manufacturing that can be used to produce high-performance, low-cost fuel cell components. Project activities will concentrate on developing a simple and cost-effective fuel cell fabrication plan along with an advanced cell configuration. Cell operation and performance will be demonstrated under specified conditions. Honeywell employs an integrated approach, consisting of two key elements, to achieve this objective: (a) the development of a process based on tape calendering for manufacturing multilayer fuel cell components and (b) an innovative unitized cell concept.



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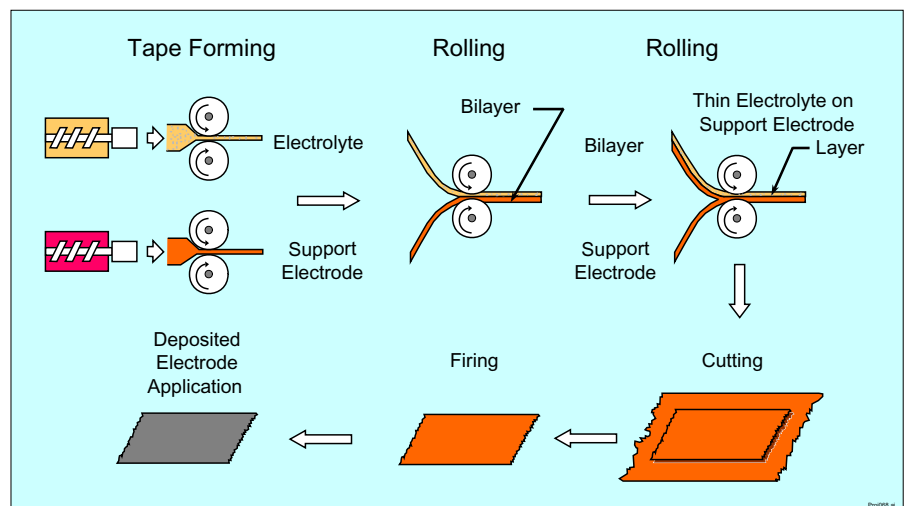
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## Benefits

The tape-calendering fabrication process and SOFC unitized cell configuration have all the characteristics required for low-cost production of high-performance cell packages that are modular, and can be easily tailored to meet specific system requirements. High-power density and cost-effective fuel cells are critical to the development of power systems with performance and costs comparable to those of current systems. SOFC systems at affordable costs will provide various important benefits including high efficiency, low environmental impact, and a wide range of applications, such as portable systems to small- and large-scale, central and distributed power generation.



*Tape Calendering Manufacturing Process*